Physics	Working towards expected outcomes Your child is not yet making the expected progress within this course.	Working at expected outcomes Your child is achieving the expected progress for this point within the course.	Working beyond expected outcomes Your child is working beyond the expected progress for this point within the course.
Autumn Term Forces and Motion	Students working **towards** expected outcomes in Y9 can: • Describe the difference between distance and displacement. • Recall typical speeds for walking, running, cycling. • Use the equation distance = speed x time to calculate speed with support. • Begin to explain the difference between speed and velocity. • Identify key features on a distance–time graph and describe what they represent. • Recognise that acceleration involves a change in velocity over time. • Describe what the slope or area of a motion graph represents with guidance • Describe how speed affects stopping distance and list basic car safety features. • Recall that momentum depends on mass and velocity. • Begin using motion equations when values are provided.	Students working **at** expected in Y9 can: • Distinguish clearly between scalars and vectors • Use and rearrange the equation s = vt confidently. • Calculate acceleration. • Explain the changes during circular motion. • Draw and analyse distance–time and velocity–time graphs, calculating gradient and interpreting area under curves. • Evaluate how factors such as speed, road conditions and driver alertness affect stopping distance. • Describe and interpret data from reaction time experiments and explain methods to reduce error. • Use the equation p=mv to calculate momentum in straightforward problems. • Apply the idea of force and momentum change to explain how safety features reduce injury in collisions.	Students working **beyond** expected in Y9 can: **In addition to all the skills listed under Working At for this topic, students working beyond expected outcomes can:** • Fluently rearrange and apply all equations including multi-step calculations involving unit conversion. • Analyse non-uniform motion using average and instantaneous speed with clear explanations. • Interpret curved velocity–time graphs and calculate areas by estimation or square-counting. • Calculate stopping distances using data and explain implications for road safety and real-world design. • Apply the concept of momentum conservation to collision problems, with explanations and calculations. • Justify how airbags, crumple zones, and seatbelts reduce injury using algebraic reasoning around force and time. • Evaluate experimental methods for measuring acceleration or reaction time and suggest improvements based on physics reasoning.

Spring Term	Students working **towards** expected outcomes in Y9 can:	Students working **at** expected in Y9 can:	Students working **beyond** expected in Y9 can:
Energy	• Describe simple energy stores (e.g. thermal, kinetic, gravitational) and how energy can move between them. • Recognise that energy can be transferred by heating, by forces, or by electricity. • Recall basic examples of useful and wasted energy. • Use given values to calculate energy using one equation with support. • Begin to describe how insulation reduces energy loss in everyday examples. • State that energy cannot be created or destroyed and give examples where energy appears to be 'lost'. • Recognise that using energy affects the environment and name some renewable and non-renewable sources.	• Identify energy stores in a range of systems and describe the transfers involved in system changes. • Use all given equations to calculate energy changes. • Rearrange and apply equations in different contexts using correct units. • Describe energy dissipation and explain what happens to 'wasted' energy. • Explain that in a closed system, energy is conserved, even when it becomes less useful. • Interpret and evaluate results from insulation practicals and suggest how materials reduce heat transfer. • Compare the efficiency of systems and suggest ways to increase it. • Identify environmental and societal impacts of different energy resources and explain why not all scientific solutions are applied in real life.	**In addition to all the skills listed under Working At for this topic, students working beyond expected outcomes can:** • Describe and analyse complex examples of system changes involving multiple energy transfers and dissipation. • Fluently rearrange and apply all equations, including combined or multi-step problems involving different forms of energy. • Interpret data to evaluate the effectiveness of different insulation materials. • Justify design choices to increase efficiency, including links to friction, heat loss, and power rating. • Critically analyse closed systems and energy conservation using real-world case studies. • Discuss the environmental impact of energy resource use with awareness of political, ethical and economic limitations. • Evaluate proposed energy solutions and suggest scientifically valid improvements or compromises. • Link understanding of energy changes to broader issues such as sustainability and climate policy.

Summer Term Waves	Students working **towards** expected outcomes in Y9 can: • Identify examples of waves in air, water and on strings. • Begin to describe the difference between transverse and longitudinal waves. • Recognise that waves can be reflected, absorbed or pass through a material. • Label amplitude and wavelength on a simple diagram. • Use the wave equation with support when values are provided. • Make basic observations during practicals and record results with guidance. • Begin to describe that sound involves vibration and that humans can only hear certain frequencies.	Students working **at** expected in Y9 can: • Describe and compare transverse and longitudinal waves with clear examples (e.g. water vs sound). • Explain that waves transfer energy, not matter with suggested evidence. • Use and rearrange the wave equation $v=f\lambda$ confidently in calculations. • Identify amplitude, wavelength and frequency from diagrams or graphs. • Describe practical methods for measuring wave speed in air and on water. • Construct ray diagrams to explain reflection and refraction at surfaces. • Describe how sound waves cause vibrations in solids and how the ear detects these vibrations. • Recall the human hearing range (20 Hz–20 kHz) and describe why some sounds cannot be heard. • Describe how wave behaviour (e.g. speed, absorption) changes in different media and how this helps explore hidden structures.	Students working **beyond** expected in Y9 can: **In addition to all the skills listed under Working At for this topic, students working beyond expected outcomes can:** • Justify classifications of waves using direction of vibration and wave motion. • Apply particle and wave models to explain complex interactions like partial transmission or refraction. • Accurately measure wavelength, frequency and speed in practical setups, and evaluate the limitations of methods. • Interpret and draw ray diagrams involving multiple reflections or curved boundaries. • Explain how sound waves are converted into signals in microphones or into vibrations in solids. • Describe in detail how differences in wave speed, reflection and absorption help in applications such as ultrasound or seismic imaging. • Explain frequency limits of hearing using the physical properties of the ear and sound wave behaviour. • Apply wave knowledge to real-world contexts with extended reasoning (e.g. sonar, noise insulation, medical scanning).